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Design of delay-range-dependent robust controller for uncertain genetic regulatory networks with interval time-varying delays

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Abstract

This paper investigates the problem of robust stabilization for genetic regulatory networks with interval time-varying delays, which are subject to norm-bounded time-varying parameter uncertainties. The time delays including lower and upper bounds of delay are assumed to appear in both the mRNA and protein. The regulatory functions are assumed to be globally Lipschitz continuous. The resulting delay-range-dependent robust controller with interval range is designed in terms of improved bounding technique. A sufficient condition for the solvability of the problem is obtained via a linear matrix inequality (LMI). When this LMI is feasible, an explicit expression of a desired state feedback controller is also given. The theory developed in this paper is demonstrated by two numerical examples.

Key words: Delay-range-dependent; Genetic regulatory networks; Interval time-varying delay; Linear matrix inequality